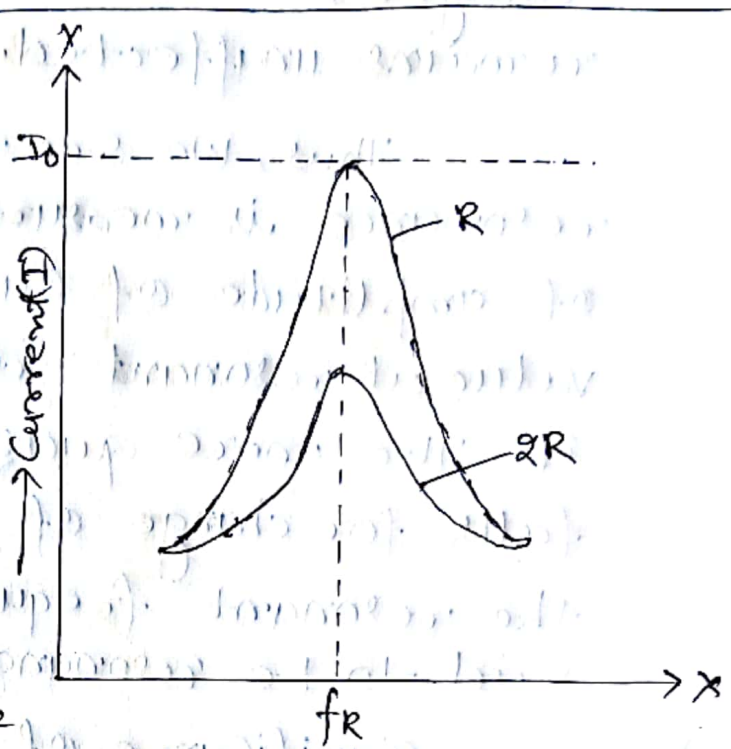
Prof. Vidya Sagar
Department of physics
Raja Singh College, Siwan

B.Sc (Part-II)
Paper - IV

Sharpness of Resonance in LCR Circuit.



If L, C and R remain fixed, and the frequency of the applied e.m.f is raised, Continously from zero, the peak (r.m.s) Current varies as shown in figure. At first, the Current is very Small increases to a maximum when the frequency increases to its resonance value f_R and then falls again. Before resonance the current leads the applied e.m.f. at resonance it lags behind the e.m.f.

The resonant value of the Current depends on the resistance R in the Circuit. It is Smaller for larger R. In figure two Curves are plotted one when the total Circuit resistance is R and the other when the circuit resistance is 2R.

Scanned with CamScanner

The resonant current in the second case is half the value in the first case. Also the resonance is sharper for small R than for larger R. However, the resonant frequency remains unaffected.

Thus, we see that the sharpness of resonance is measure of the rate of fall of amplitude of current from its maximum value at resonant frequency on either side of it. The more quickly the current amplitude falls for change of frequency both sides of the resonant frequency f_R, the sharper is said to be resonance.

Significance of Resonance:- The series resonant circuit is called an acceptor circuit. This is because the impedance of the circuit is minimum at resonance so that it most readily accepts that current out of many currents whose frequency is equal to its resonant frequency. In radio receivers, the resonant frequency of the circuit is tuned by changing L or C to the frequency of the signal desired to be detected.

Scanned with CamScanner